What on Earth Is

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Have you ever seen icing like this? I hadn't until I made a detachment to NAS Fallon in January 2005. This icing is called "pogonip," a meteorological term originally used by Native Americans to describe the frozen fogs of fine ice crystals that settle on trees, fences and plants. NAS Fallon normally only sees one pogonip episode per year, and it usually lasts only one or two days. However, two significant episodes occurred during the winter of 2004-2005. This particular incident started around Jan. 15 and continued into February. A temperature inversion settled over the valley, trapping the cold, moist air between the Sierra Nevadas. Meanwhile, warmer El Nino air from the south moved over the dense, cold air, packing it down and holding it.

What does NATOPS say? It prohibits operating the J52 motor in ice-fog conditions, unless operational necessity dictates. Most commanding officers will agree that training missions do not qualify as operational necessity, so NAS Fallon airwing events don't launch in ice fog. NATOPS warns specifically of rapid ice build-up on engine-inlet vanes and blades in extreme low temperatures, high humidity, or visible moisture conditions. The engine's anti-ice capability cannot overcome the tremendous ice-producing capability of ice fog being sucked through the high-velocity inlet of a Prowler intake.

The Prowler community has had a close call in these weather conditions. In 1992, a Prowler at NAS Fallon started engines in ice-fog conditions. Ice fog had been moving in and out of the area for several hours. The crew started engines and immediately turned on the anti-ice system. The aircraft taxied for takeoff. While waiting for departure clearance, the port motor flamed out with no abnormal engine indications. While the crew was taxiing back to their line to investigate the problem, the starboard engine also flamed out. After towing the aircraft back to the line, mechs dove the ducts. They found a half-inch of ice buildup on the back of the first stage compressor blades. The anti-ice capability of the motor at idle could not handle the ice build-up.

Interim Rapid Action Change (IRAC) 34 to the EA-6B General Information and Servicing Manual changed the temperature/ humidity restrictions for turning a J52-P408A/B motor. It says, "at temperatures between 28 and 42 degrees Fahrenheit, with a relative humidity above 50 percent, engines being turned with FOD screens should be monitored constantly for ice build-up on the screens. If ice starts to form, the engine should be shut down immediately." Common sense would dictate that, in any extremely low temperature, high-humidity, visible-moisture conditions, constant monitoring of the engine inlet/FOD screens should be the norm.

The recent IRAC change affected one major area. Turn-qualified personnel used to be able to turn the motor on deck in low-temperature, high-humidity con-

Pogonip?

ditions without monitoring engine FOD screens. Now, observation of the screens offers a better chance of detecting ice build-up, which could cause FOD damage to the motor.

What else can you do? During times of operational necessity, you can take a few steps to limit the motor's exposure to damage from ice build-up. Once anti-ice/deicing steps have been taken, you must limit deck operation to four consecutive minutes at idle rpm. After four minutes, the engines should be run up to full power, retarded to 75 percent, and stabilized for one minute. Then, the engines can be retarded to idle and the four-minute counter reset. Also, NATOPS says to run engines for a minimum of five minutes before moving any control surfaces; this will limit damage to hydraulic lines and seals. Cold hydraulic fluid moving through cold rubber seals can cause leaks. NATOPS also warns of oil-pressure problems in extremely cold temperatures and recommends running the engine at idle for a short time after initial start-up. This initial idling should pre-heat the engine oil and increase its viscosity, allowing easier pick-up by the oil pump and easier movement through oil bearings and injector heads.

In any case, if engine limits are exceeded in any regime, or if you hear abnormal engine noises, discontinue start attempts and shut down the motor. Engine-inlet preheating can be applied, depending upon the availability of such equipment.

Take care of yourself and your aircraft. If you ever witness these conditions, remember to review your procedures. Ice fog can damage the J52 motor, and we cannot afford to waste your valuable time repairing an engine problem that could have been avoided.